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NOTES ON UREDINOPSIS MIRABILIS AND OTHER RUSTS

W. P. Fraser

A few culture experiments were carried on during the season of 1913, and, though nothing new was established by these cultures, yet, since some of them confirm important results that rest only on the previous experiments and observations of the writer, a brief record may be of interest.

Little culture material could be found in the vicinity of Macdonald College, so that the writer was dependent on the generosity of the following who contributed material for the experiments: Professors R. Matheson and H. W. Smith, of the Nova Scotia Agricultural College, Truro; Mr. Robert Inglis, Pictou, N. S.; Miss Muriel Macrae, Durham, N. S.; and Mr. W. H. Brittain, Plant Pathologist of British Columbia. To these, the writer wishes to express his sincere thanks.

Uredinopsis mirabilis (Peck) Magn.

Teliosporic material of this rust collected at Truro, N. S., was placed in a moist chamber until the teliospores were germinating freely. It was then suspended above a young plant of *Abies balsamea* (L.) Mill. on May 15th. Pycnia were present on the leaves on May 23d and aecia in abundance on June 1st. Another sowing on May 15th gave pycnia on May 25th followed by abundant aecia. A third sowing on May 16th was followed by pycnia on May 27th and aecia by June 3d, both in abundance. Two other sowings were made later with success, but the infection was not so marked, probably owing to the shoots being more mature. Six plants of *Abies balsamea* obtained at the same time and place were kept as checks and remained free from infection.

The species of the genus *Uredinopsis* are not separated by any marked morphological differences, also a number of them have their aecia on *Abies balsamea,* so the question arises whether they are distinct or should be included under one species. To obtain cultural evidence bearing on this matter, the following experiments were made.

The aeciospores of *Uredinopsis mirabilis* obtained by the experiment just described were placed in distilled water, and by means of an atomizer were sown on the following ferns on June 14th: *Onoclea sensibilis* L., *Aspidium Thelypteris* (L.) Sw., *Osmunda Claytoniana* L., *O. regalis* L., *Phegopteris Dryopteris* (L.) Fée. Uredinia were noticed on June 21st on *Onoclea sensibilis* and soon became abundant. There was no infection of the other ferns. Another sowing on June 16th of culture aeciospores on *Onoclea sensibilis, Asplenium Filix-femina* (L.) Bernh., *Osmunda Claytoniana* and *Aspidium Thelypteris* gave abundant uredinia on *Onoclea sensibilis* by June 24th, but no infection of the others. A third sowing on June 26th on *Aspidium Thelypteris, Asplenium Filix-femina, Onoclea sensibilis* and *Phygopteris Dryopteris* was followed by abundant uredinia on *Onoclea sensibilis* but no infection of the other plants. A number of checks of *Onoclea sensibilis* remained free from infection.

These experiments confirm the work of last year and indicate clearly that *Uredinopsis mirabilis* is a distinct species.[1]

MELAMPSORA MEDUSAE Thüm.

Teliosporic material of this rust collected near Pictou, N. S., was sown on young trees of *Tsuga canadensis* on May 28th. Pycnia were present by June 5th, and aecia were first noticed appearing on June 8th, both in great abundance. Five trees kept as checks showed no infection. Branches of *Tsuga canadensis* bearing cones were placed in water and germinating teliosporic material suspended above the cones on June 20th. Pycnia were present on the cones on June 27th and were soon abundant, but only one matured aecia. Doubtless the failure to mature aecia was due to the unhealthy condition of the cones, most of them dying before the aecia had time to mature.

Attempts were made to infect *Larix laricina* (Du Roi) Koch. in the field, but without success. Two sowings of germinating teliosporic material on a flourishing young tree of the same species in the laboratory also failed.

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[1] See MYCOL. 4: 236. 1913.

From field observations and culture experiments described in this and previous papers, the writer concludes that the *Melampsora* on *Populus grandidentata* in eastern Canada has its aecia on the leaves, young twigs and cones of *Tsuga canadensis* and does not infect *Larix laricina*.[2] It may be that the rust on *Populus grandidentata* is a distinct species as Arthur[3] has shown that *Melampsora Medusae* on *P. deltoides* and *P. tremuloides* has aecia on *Larix*, but for the present it seems best to regard it as a specialized form of *Melampsora Medusae*. Attempts to infect *Populus deltoides* with the aeciospores obtained from the culture failed.

PUCCINIASTRUM MYRTILLI (Schum.) Arth.

Teliosporic material of this rust on *Gaylussacia resinosa* (Ait.) T. & G., collected at Isle Perrot, P. Q., was sown on *Tsuga canadensis* on May 28th. Pycnia were present on June 9th and aecia on June 16th, both in abundance.[4]

CALYPTOSPORA COLUMNARIS (Alb. & Schw.) Kühn

Germinating teliosporic material of this rust on *Vaccinium pennsylvanicum* Lam., collected at Pictou, N. S., was sown on *Abies balsamea* on May 15th. Aecia were noticed on June 3d and were mature by June 12th. No pycnia were formed.[5]

PERIDERMIUM HARKNESSII Moore

Attempts were made with the aeciospores of this form collected at Vernon, B. C., to infect *Commandra umbellata* (L.) Nutt., but without success. It was doubtful, however, if the aeciospores were in good condition when sown.

SUMMARY OF CULTURES DESCRIBED IN THIS ARTICLE

Uredinopsis mirabilis Magn. Five successful sowings of teliospores from *Onoclea sensibilis* L. on *Abies balsamea* (L.) Mill.

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[2] See MYCOL. 3: 188. 1912; 5: 238. 1913.

[3] Jour. Myc. 10: 13. 1904; 11: 52. 1905; 12: 13. 1906.

[4] See MYCOL. 5: 237. 1913.

[5] See MYCOL. 4: 177. 1912.

Three successful sowings of culture aeciospores on *Onoclea sensibilis* L. but failure to infect *Osmunda Claytoniana* L., *Osmunda regalis* L., *Aspidium Thelypteris* (L.) Sw., *Asplenium Filix-femina* (L.) Bernh., and *Phegopteris Dryopteris* (L.) Fée.

Melampsora Medusae Thüm. Teliospores from *Populus grandidentata* Michx., infected *Tsuga canadensis* (L.) Carr, but failed to infect *Larix laricina* (DuRoi) Koch.

Pucciniastrum Myrtilli (Schum.) Arth. Teliospores from *Gaylussacia resinosa* (Ait.) T. & G., infected *Tsuga canadensis* (L.) Carr.

Calyptospora columnaris (Alb. & Schw.) Kühn. Teliospores from *Vaccinium pennsylvanicum* Lam., infected *Abies balsamea* (L.) Mill.

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